

et al. reference and can find no teaching or suggestion of using a heterodyne circuit. In fact, Wu et al. is careful to distinguish itself over a heterodyne circuit.

By way of background, a heterodyne receiver is one that is configured to combine a carrier wave frequency with an intermediate frequency to produce a supersonic signal that is subsequently down-sampled, amplified, and demodulated. In contrast, a homodyne receiver down-converts an incoming RF signal in one step by mixing with an oscillator output of *the same frequency*.

Whether a circuit is a homodyne or heterodyne has little to do with the mixers that are used. The teachings of I and Q mixers in Wu et al. at column 2, lines 12-25 is a common technique for homodyne receivers, and Wu et al. specifies them as such in relation to the I and Q channels. Nowhere does Wu et al. teach or suggest a two-stage receiver for the use with an intermediate frequency. Rather, Wu et al. specifically and correctly teaches that in a homodyne receiver, "the local oscillator that is used to generate the CW carrier signal transmitted to the Tags is also used as the local oscillator in the demodulator." (See column 2, lines 12-16.)

There is no teaching or suggestion in Mays or Wu et al. for the use of a heterodyne receiver. Neither of these references, taken alone or in any combination thereof, teach or suggest the use of two antennas.

Turning to the claims, claim 1 clearly recites the use of a frequency-hopping source in combination with a transmitter coupled to an antenna circuit to transmit the generated radio frequency signals and a heterodyne receiver coupled to the antenna circuit to receive on the antenna circuit reflected radio-frequency signals from an RFID tag. Claim 1 also recites a signal processor coupled to the antenna circuit and to the heterodyne receiver to receive the reflected radio-frequency signals and to extract data contained therein. As discussed above, nowhere do Mays et al. or Wu et al., taken alone or in any combination thereof, teach or suggest the combination recited in claim 1 that specifically recites a heterodyne receiver. Thus, applicant respectfully submits that claim 1 is allowable.

Dependent claim 2-6 are also allowable for the reasons why claim 1 is allowable. In particular, claim 3 recites two antennas, one for the transmitter and one for the receiver in the interrogator. Claim 5 recites the frequency-hopping source configured to sequentially generate radio-frequency signals at regular time intervals. Mays et al. does not teach sequential

generation of such signals. In Mays et al., the system is configured for varying dwell times (see column 10, lines 55-56 and column 11, lines 12-13). A homodyne receiver is more effected by noise, such that the ability to have a varying dwell time is required to avoid the noise. A heterodyne receiver, on the other hand, is more noise-resistant and can be truly sequential.

Independent claim 7 is directed to a method that includes heterodyne reception of the signals from an RFID tag device in response to pseudo-randomly selected transmission frequencies using a frequency-hopping source in the RFID interrogator. Applicant submits that claim 7 as well as dependent claims 8-13 are allowable over the references cited and applied by the Examiner for the reasons why claim 1 is allowable.

Independent claims 14 and 18 contain similar limitations with respect to the heterodyne reception technique and associated receiver. Applicant submits that claims 14 and 18, as well as all claims depending therefrom, are allowable for the reasons why claim 1 is allowable.

In the event the Examiner disagrees with the foregoing or finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact applicant's undersigned representative by telephone at (206) 622-4900 in order to expeditiously resolve prosecution of this application.

Consequently, early and favorable action allowing these claims and passing this case to issuance is respectfully solicited.

Response to Office Action dated May 20, 2003  
Application No. 09/833,391

The Commissioner is authorized to charge any additional fees due by way of this  
Response, or credit any overpayment to our Deposit Account No. 19-1090.

Respectfully submitted,

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